FIG. 1

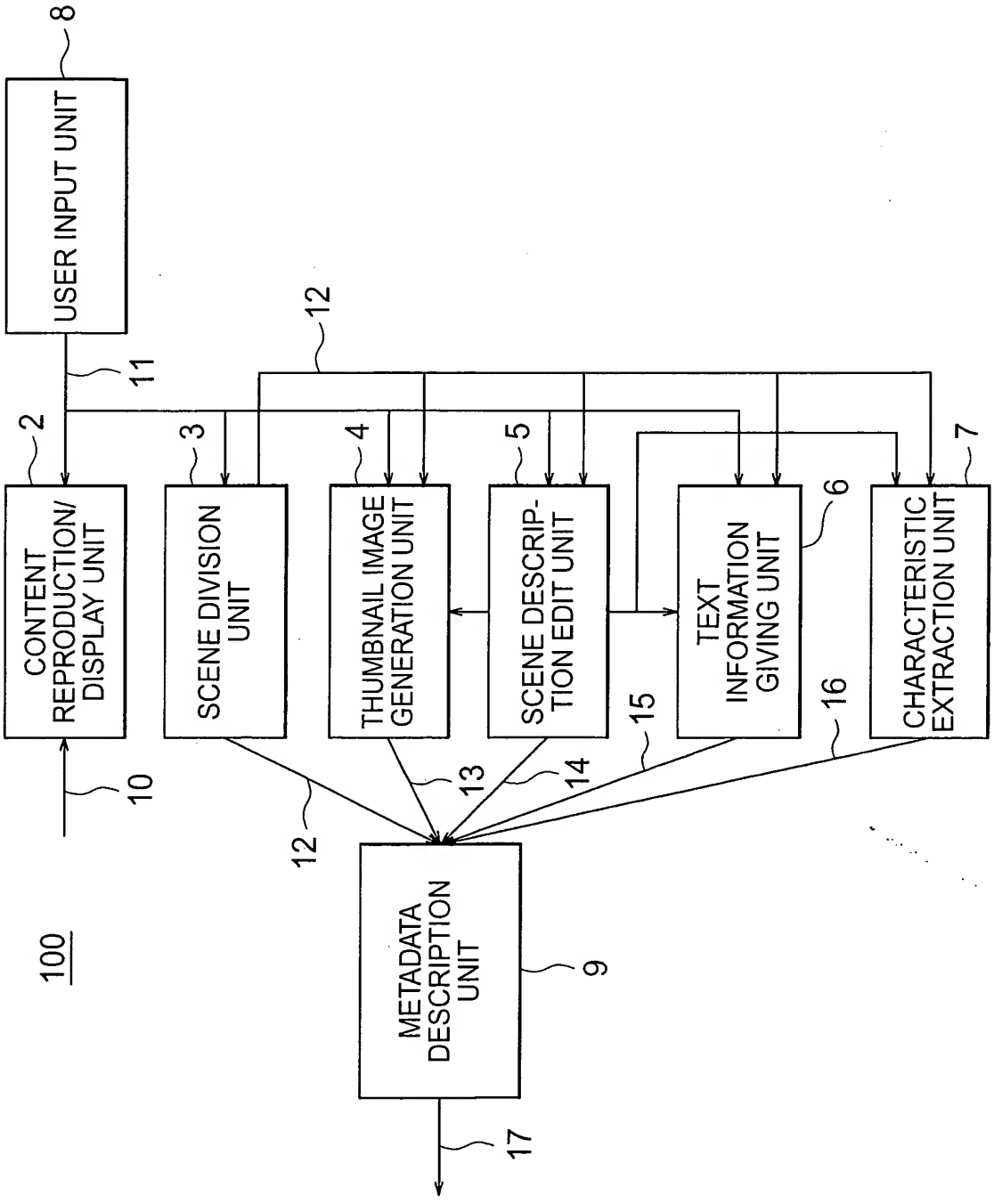

100
USER INPUT UNIT
8
11
12
CONTENT REPRODUCTION/ DISPLAY UNIT
2
SCENE DIVISION UNIT
3
THUMBNAIL IMAGE GENERATION UNIT
4
SCENE DESCRIP- TION EDIT UNIT
5
TEXT INFORMATION GIVING UNIT
6
CHARACTERISTIC EXTRACTION UNIT
7
10
12
13
14
15
16
METADATA DESCRIPTION UNIT
9
17

FIG. 2

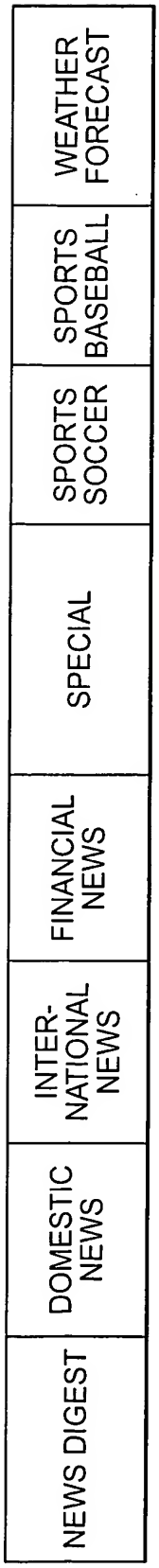

NEWS DIGEST
DOMESTIC NEWS
INTER-NATIONAL NEWS
FINANCIAL NEWS
SPECIAL
SPORTS SOCCER
SPORTS BASEBALL
WEATHER FORECAST

FIG. 3

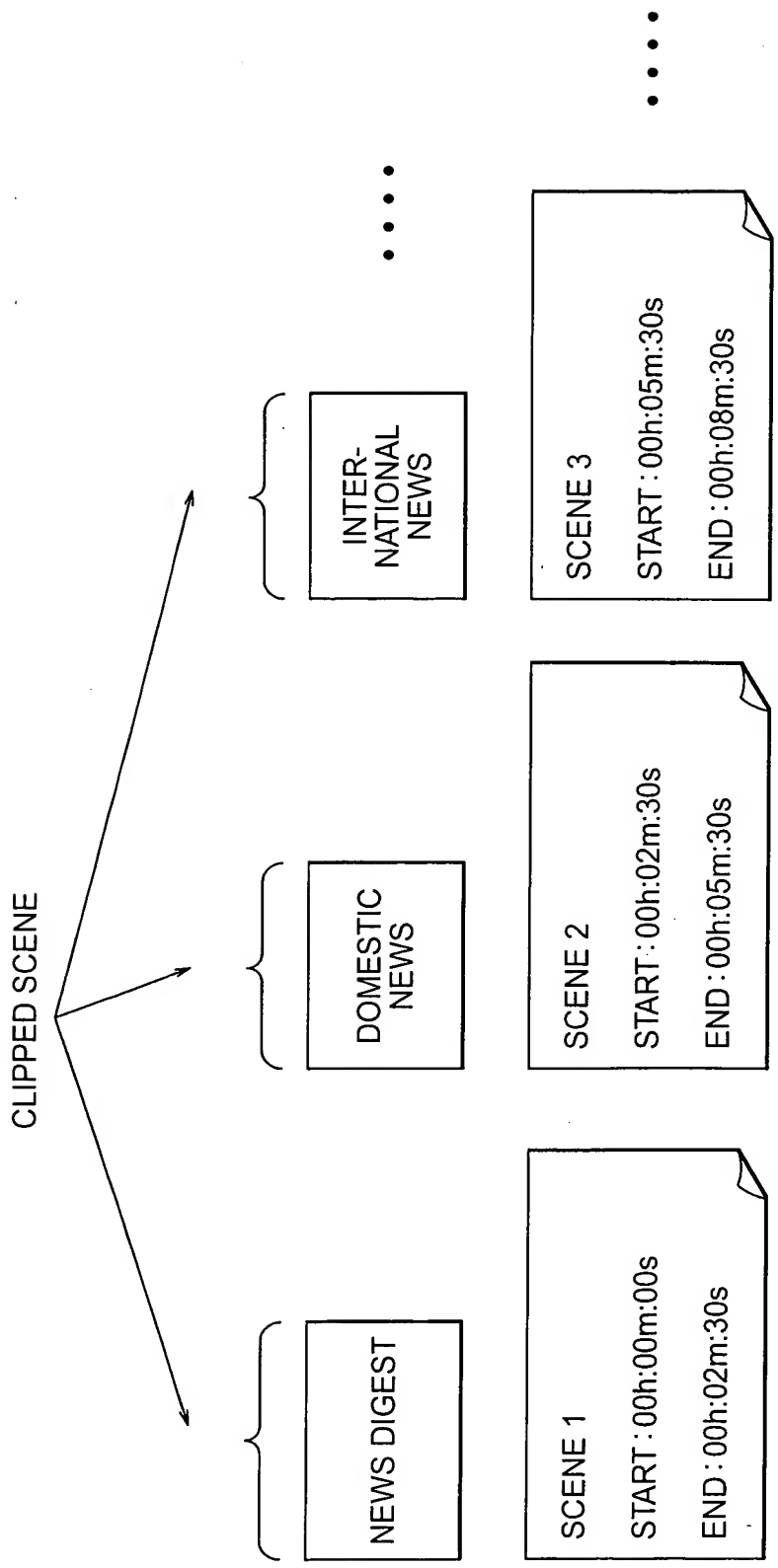

CLIPPED SCENE
NEWS DIGEST
DOMESTIC NEWS
INTER-NATIONAL NEWS
SCENE 1
START : 00h:00m:00s
END : 00h:02m:30s
SCENE 2
START : 00h:02m:30s
END : 00h:05m:30s
SCENE 3
START : 00h:05m:30s
END : 00h:08m:30s

FIG. 4

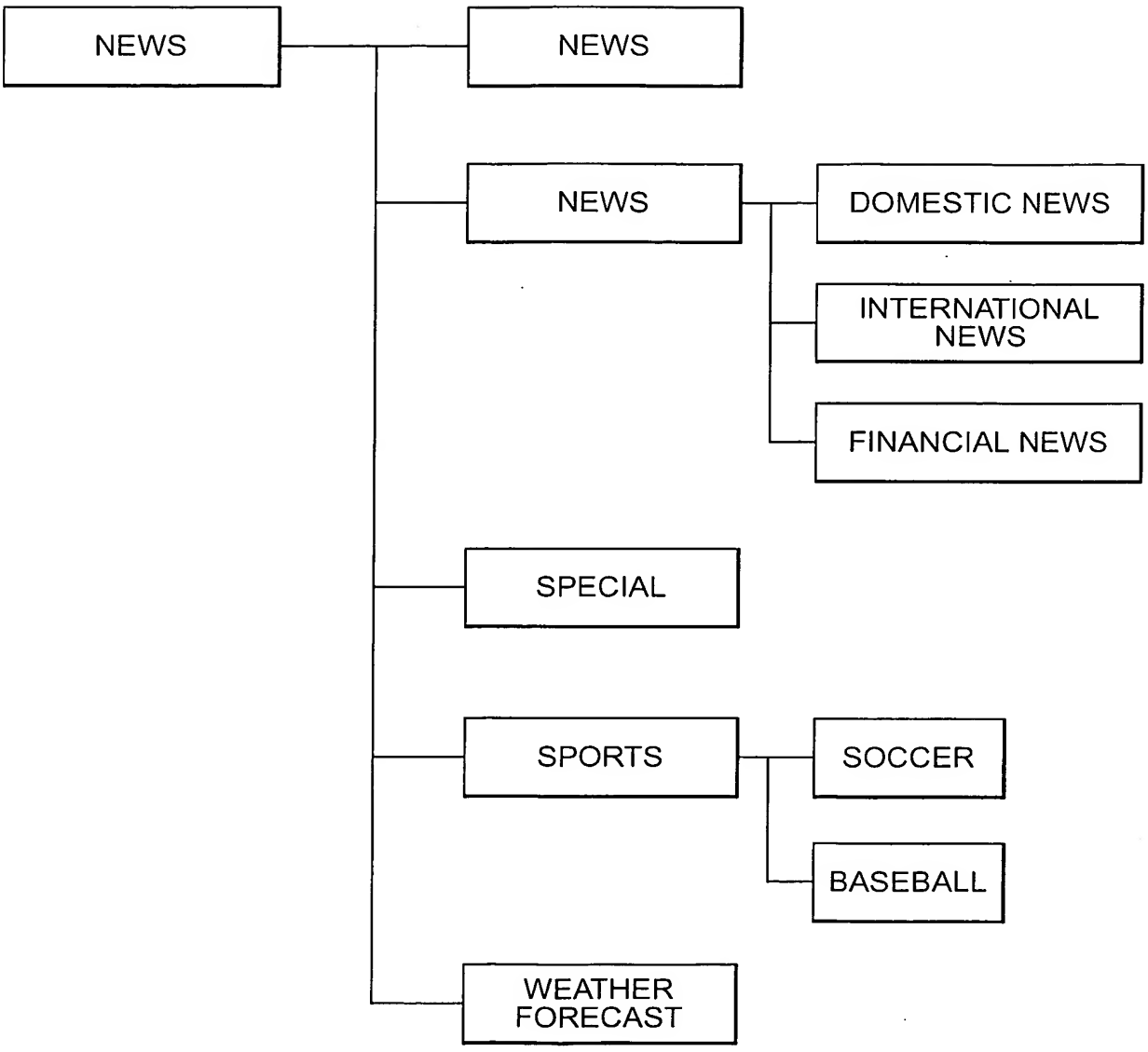

NEWS
NEWS
NEWS
DOMESTIC NEWS
INTERNATIONAL NEWS
FINANCIAL NEWS
SPECIAL
SPORTS
SOCCER
BASEBALL
WEATHER FORECAST

FIG. 5

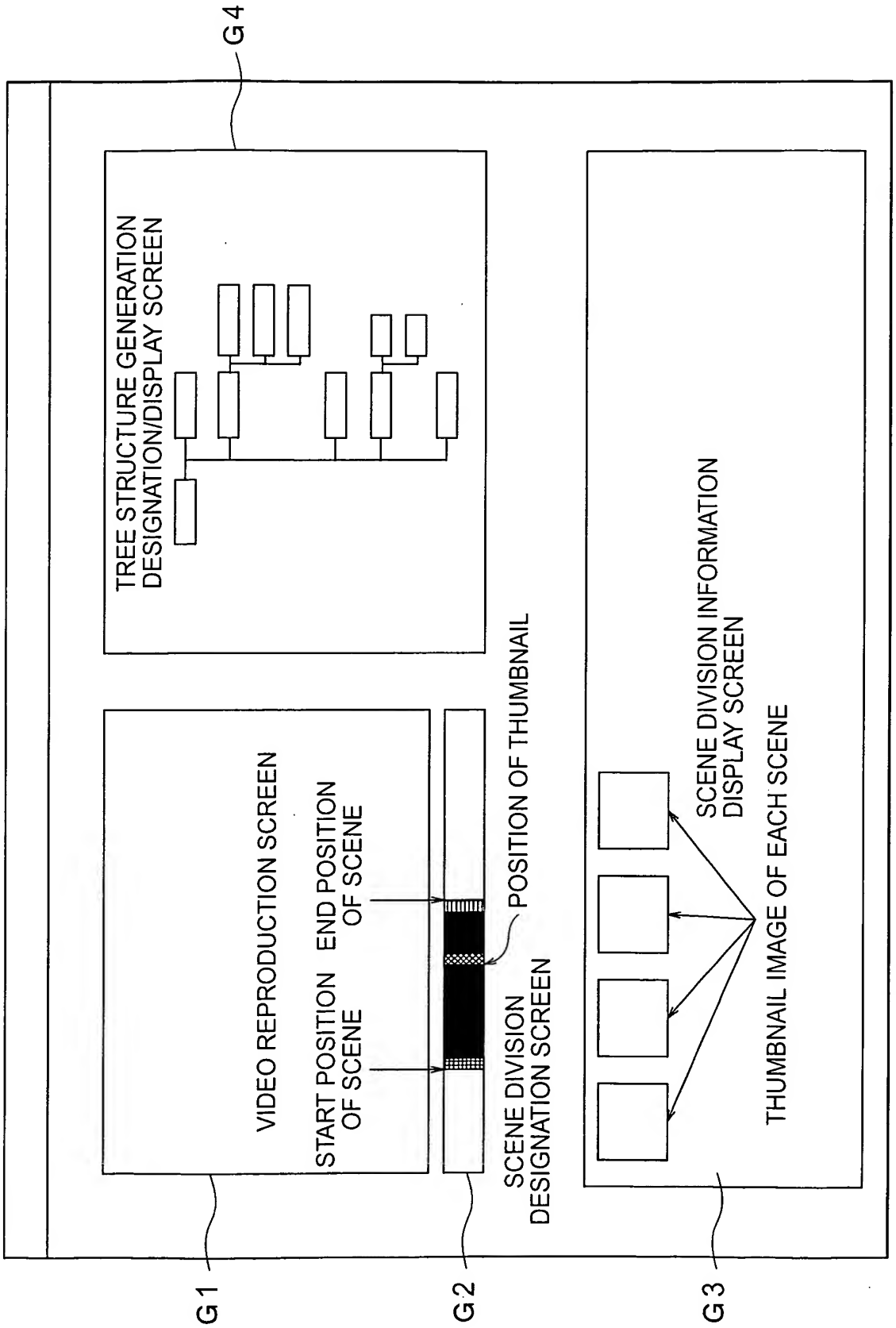

G4
TREE STRUCTURE GENERATION DESIGNATION/DISPLAY SCREEN
VIDEO REPRODUCTION SCREEN
START POSITION OF SCENE
END POSITION OF SCENE
POSITION OF THUMBNAIL
SCENE DIVISION DESIGNATION SCREEN
SCENE DIVISION INFORMATION DISPLAY SCREEN
THUMBNAIL IMAGE OF EACH SCENE
G1
G2
G3

FIG. 6

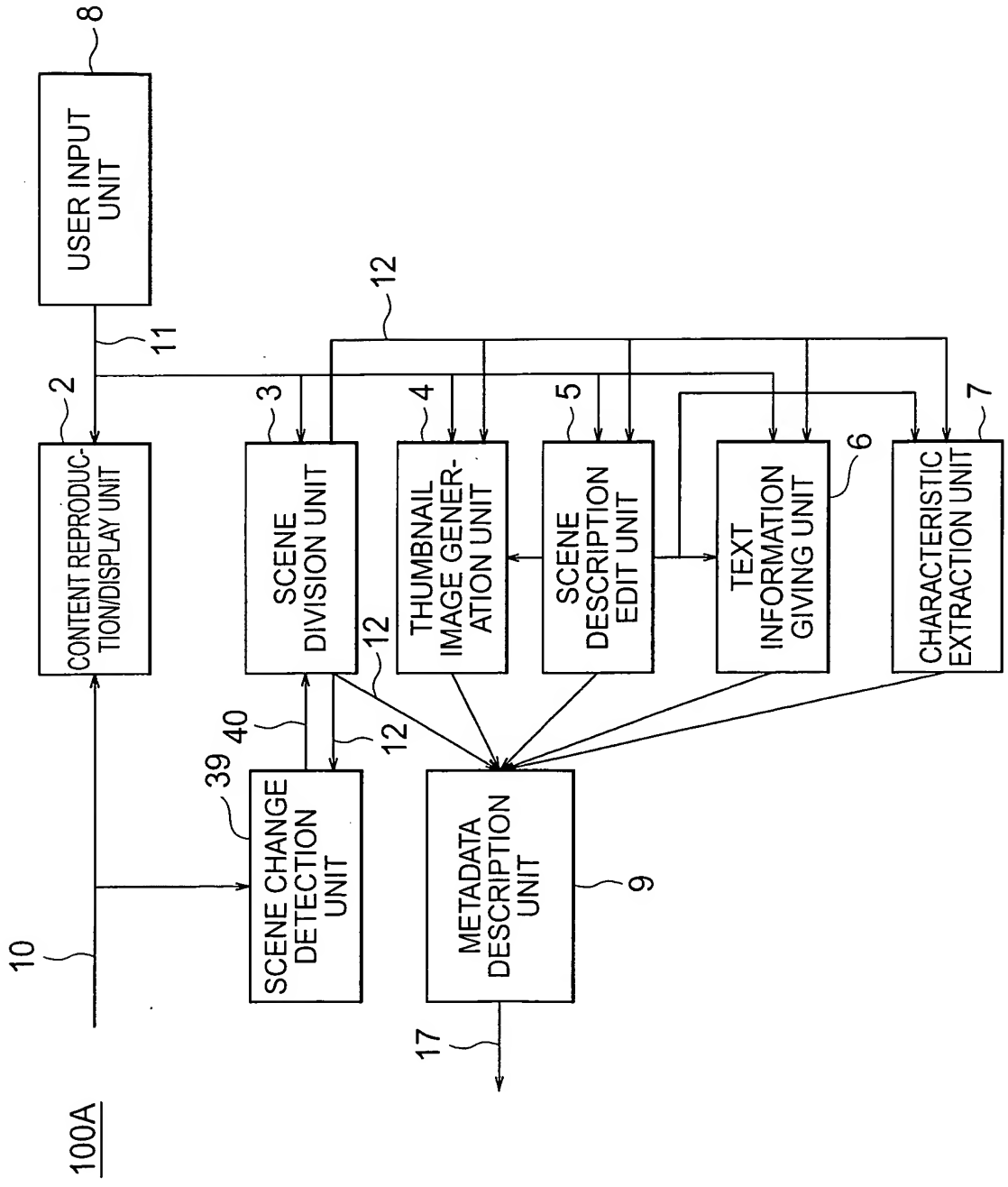

100A
USER INPUT UNIT
8
CONTENT REPRODUC-TION/DISPLAY UNIT
2
SCENE DIVISION UNIT
3
THUMBNAIL IMAGE GENER-ATION UNIT
4
SCENE DESCRIPTION EDIT UNIT
5
TEXT INFORMATION GIVING UNIT
6
CHARACTERISTIC EXTRACTION UNIT
7
SCENE CHANGE DETECTION UNIT
39
METADATA DESCRIPTION UNIT
9
10
11
12
12
12
40
17

FIG. 7

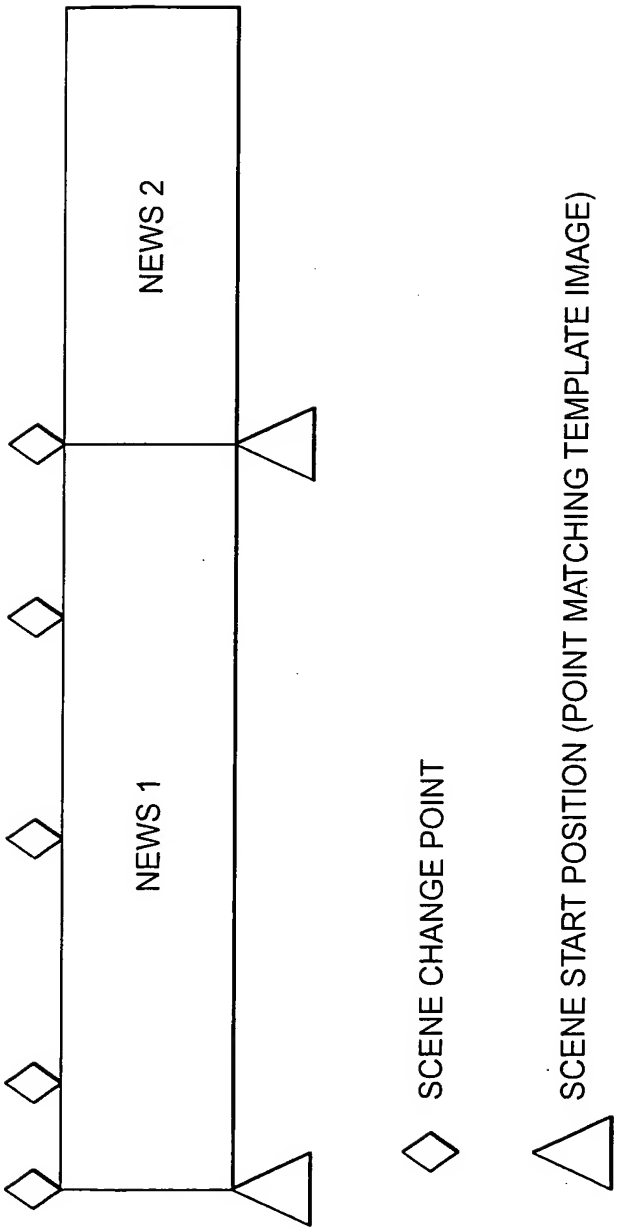

NEWS 2
NEWS 1
SCENE CHANGE POINT
SCENE START POSITION (POINT MATCHING TEMPLATE IMAGE)

FIG. 8

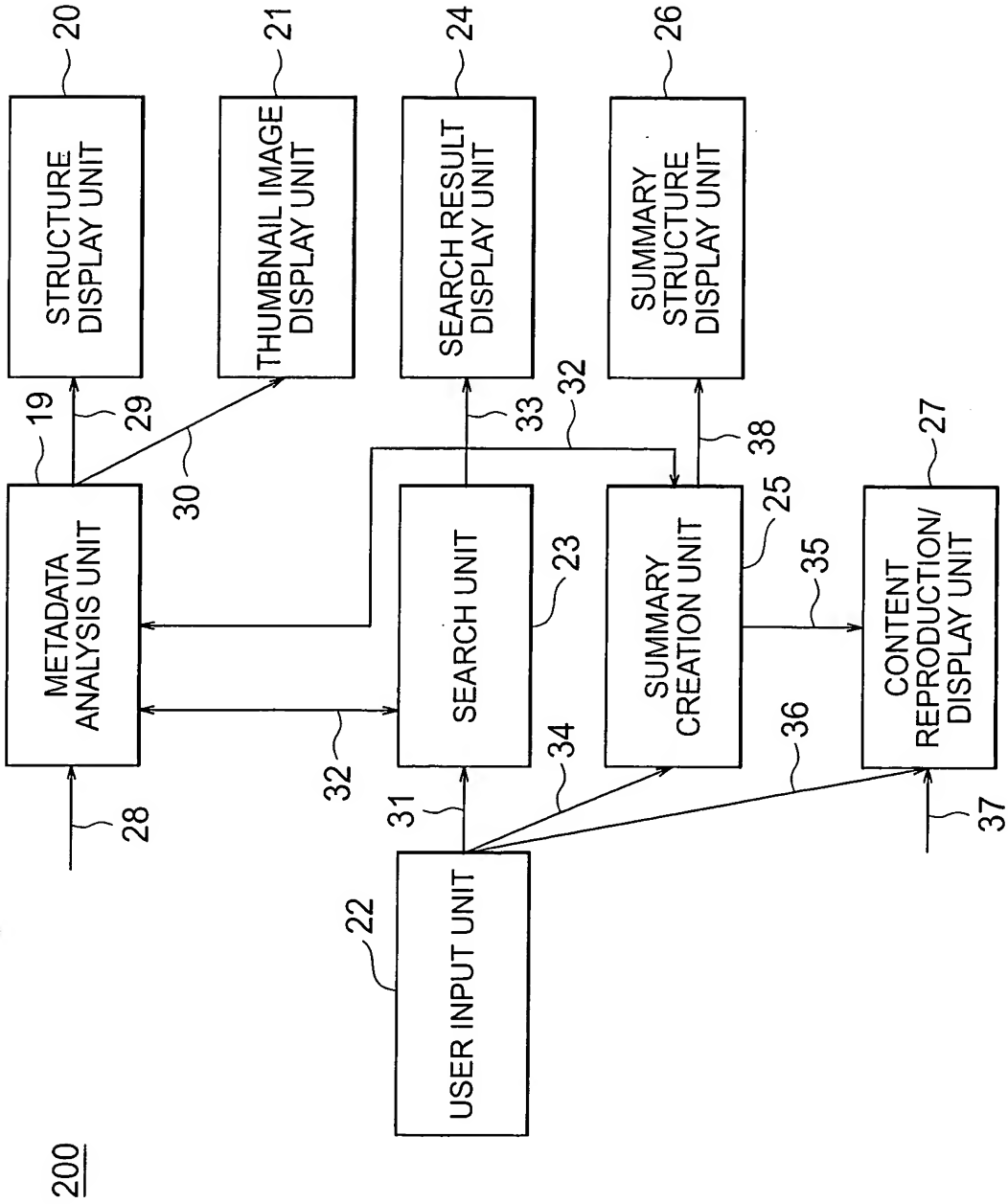
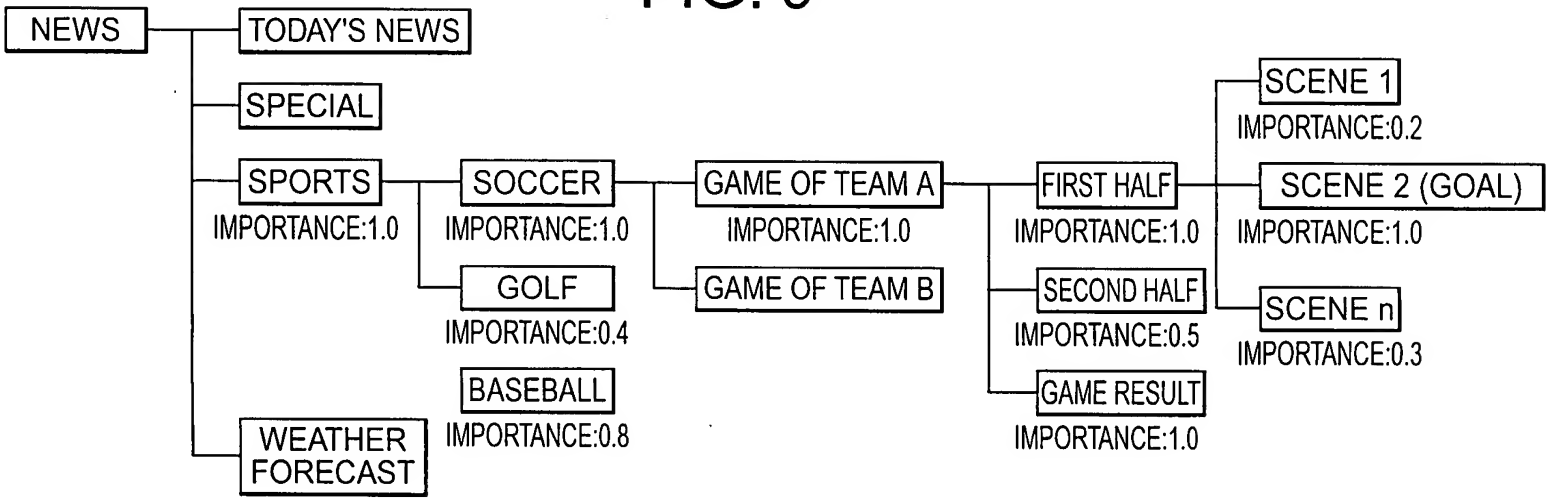
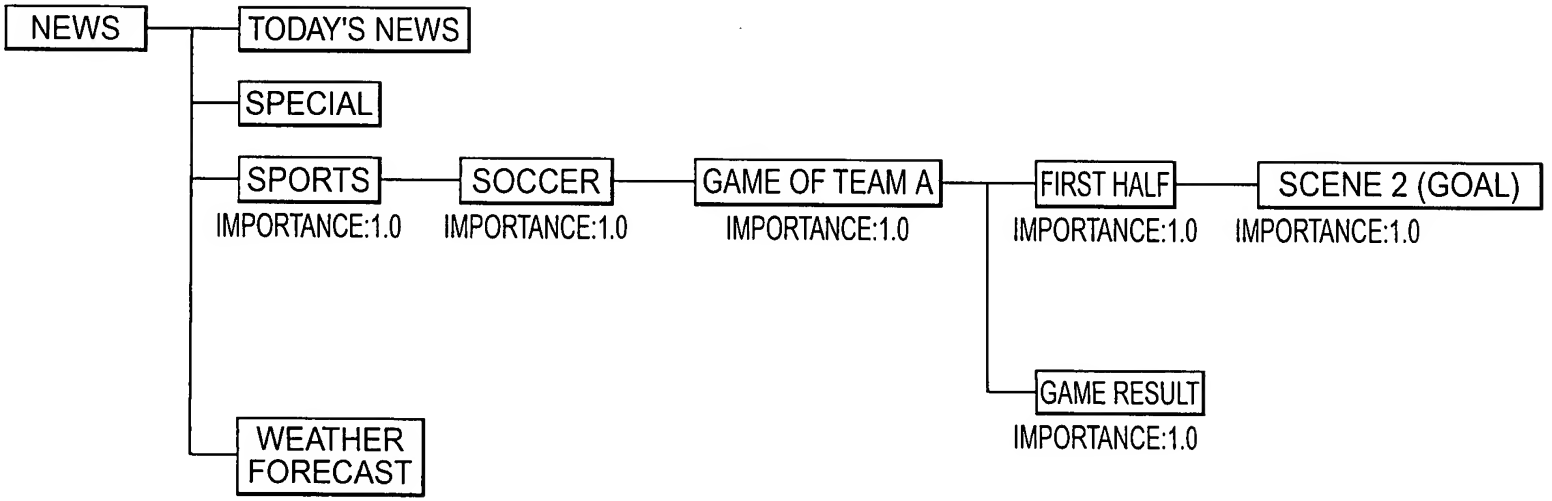

200
METADATA ANALYSIS UNIT
STRUCTURE DISPLAY UNIT
THUMBNAIL IMAGE DISPLAY UNIT
SEARCH RESULT DISPLAY UNIT
SUMMARY STRUCTURE DISPLAY UNIT
SEARCH UNIT
SUMMARY CREATION UNIT
CONTENT REPRODUCTION/ DISPLAY UNIT
USER INPUT UNIT
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38

FIG. 9



(a) SCENE STRUCTURE OF ORIGINAL CONTENT



(b) SCENE STRUCTURE OF SUMMARIZED CONTENT

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FIG. 10

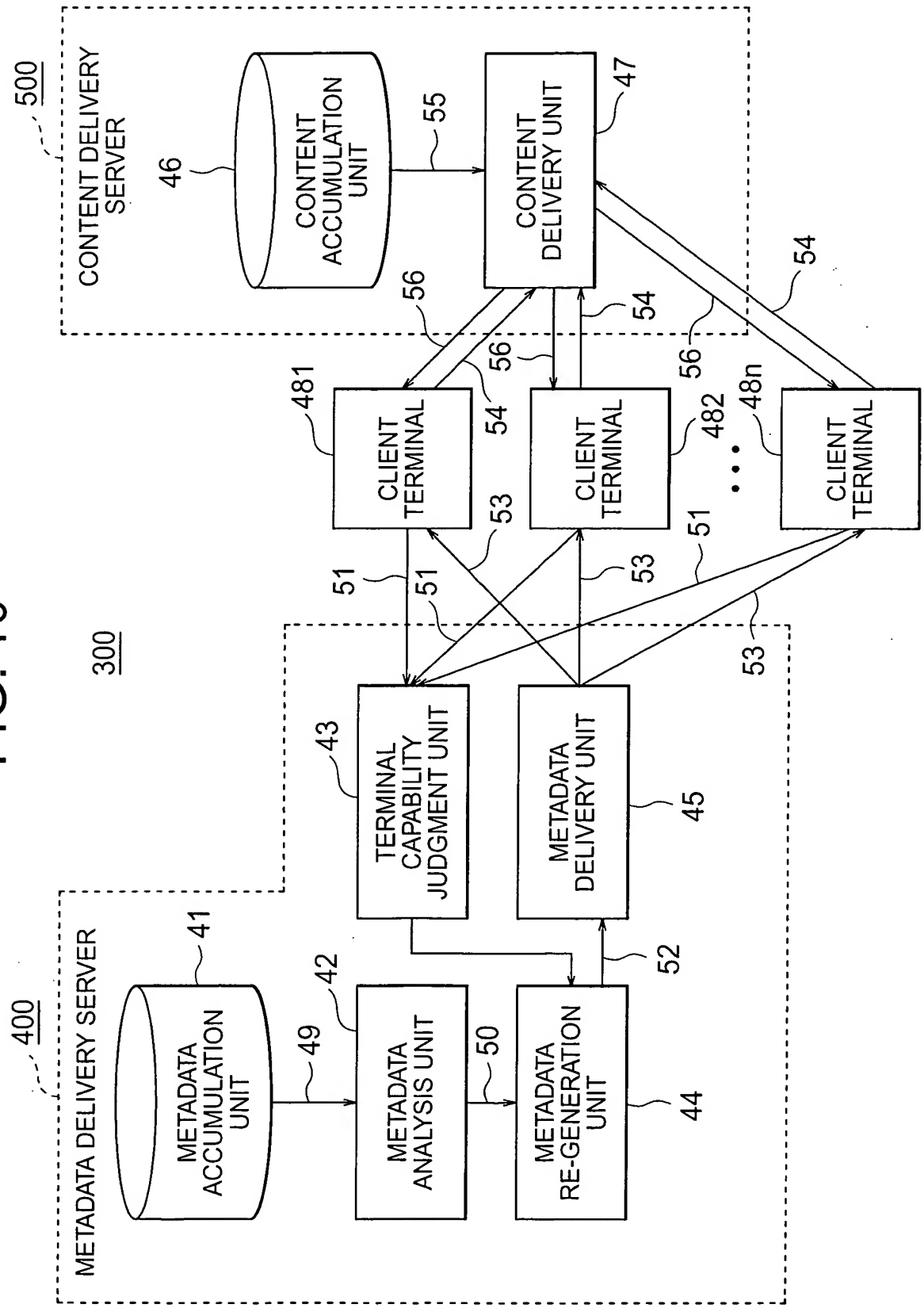
500
CONTENT DELIVERY SERVER
46
CONTENT ACCUMULATION UNIT
55
CONTENT DELIVERY UNIT
47
54
56
481
CLIENT TERMINAL
482
48n
CLIENT TERMINAL
CLIENT TERMINAL
51
53
300
43
TERMINAL CAPABILITY JUDGMENT UNIT
METADATA DELIVERY UNIT
45
52
400
METADATA DELIVERY SERVER
41
METADATA ACCUMULATION UNIT
49
42
METADATA ANALYSIS UNIT
50
METADATA RE-GENERATION UNIT
44

FIG. 11

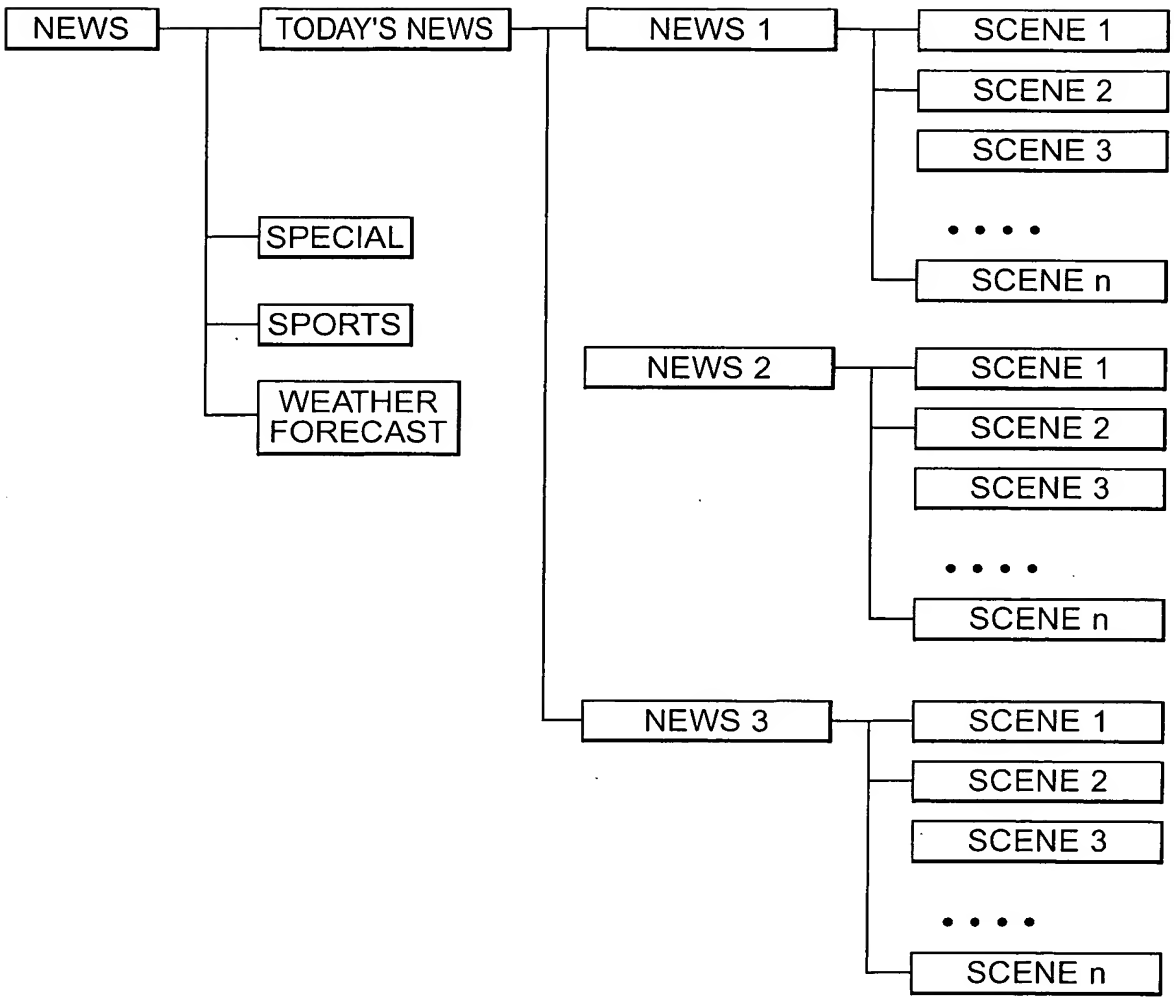
NEWS
TODAY'S NEWS
SPECIAL
SPORTS
WEATHER FORECAST
NEWS 1
SCENE 1
SCENE 2
SCENE 3
SCENE n
NEWS 2
SCENE 1
SCENE 2
SCENE 3
SCENE n
NEWS 3
SCENE 1
SCENE 2
SCENE 3
SCENE n

FIG. 12

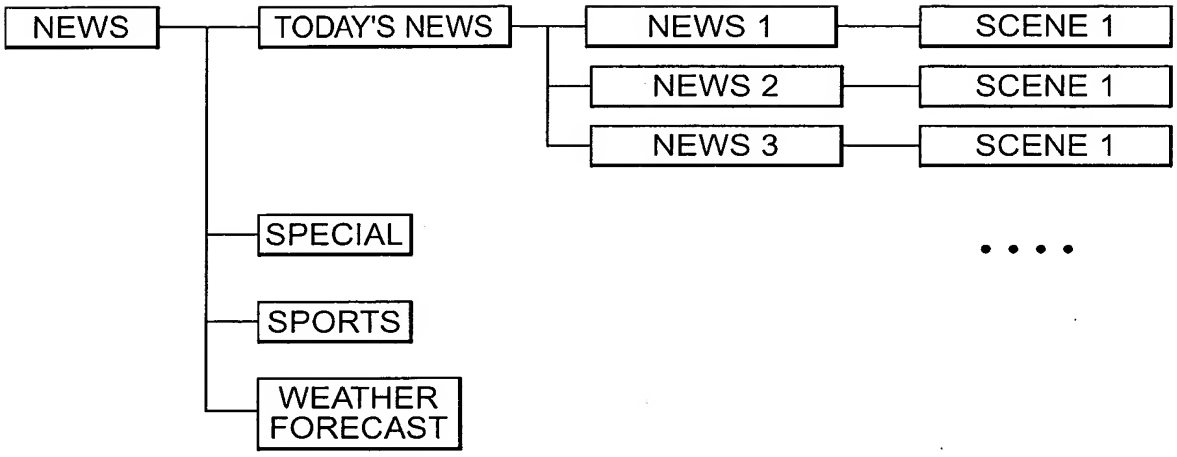
NEWS
TODAY'S NEWS
NEWS 1
SCENE 1
NEWS 2
SCENE 1
NEWS 3
SCENE 1
SPECIAL
SPORTS
WEATHER FORECAST

FIG. 13

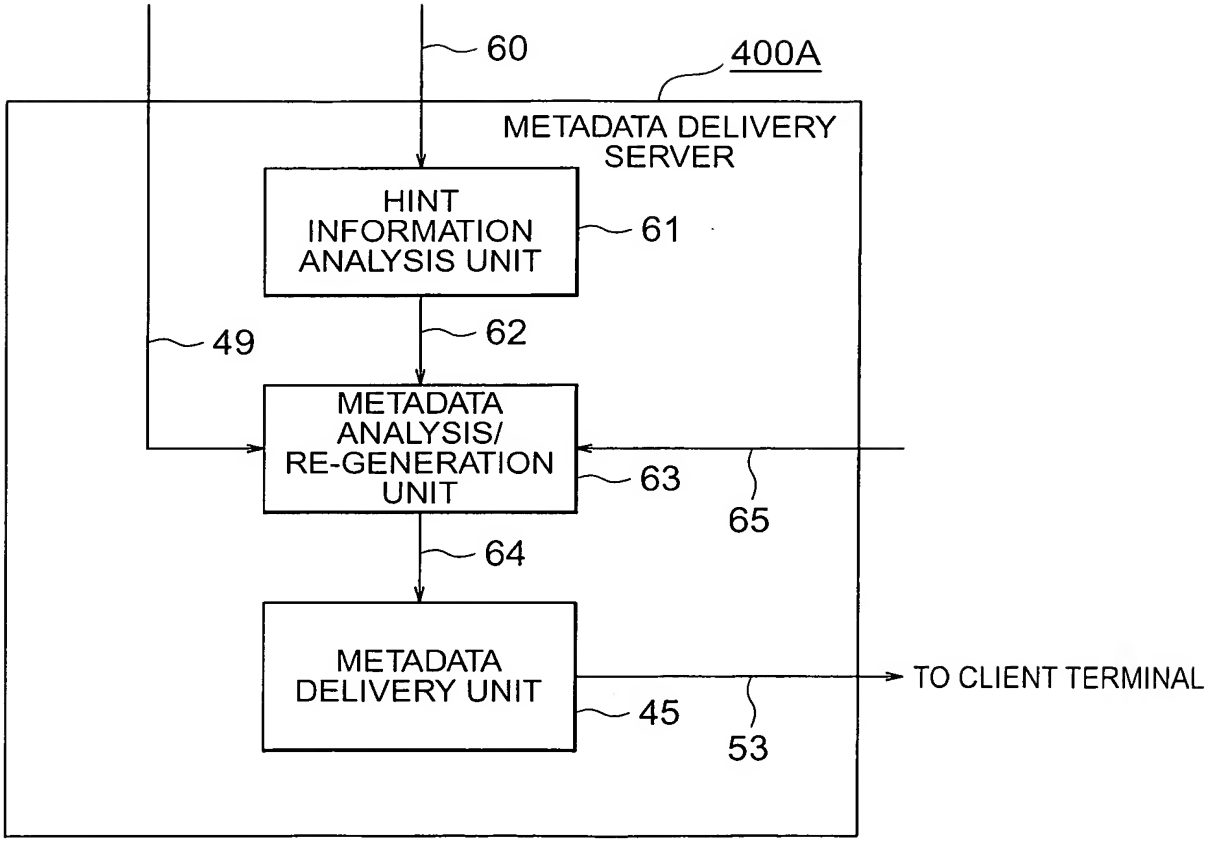
60
400A
METADATA DELIVERY SERVER
HINT INFORMATION ANALYSIS UNIT
61
49
62
METADATA ANALYSIS/ RE-GENERATION UNIT
63
65
64
METADATA DELIVERY UNIT
45
53
TO CLIENT TERMINAL

FIG. 14

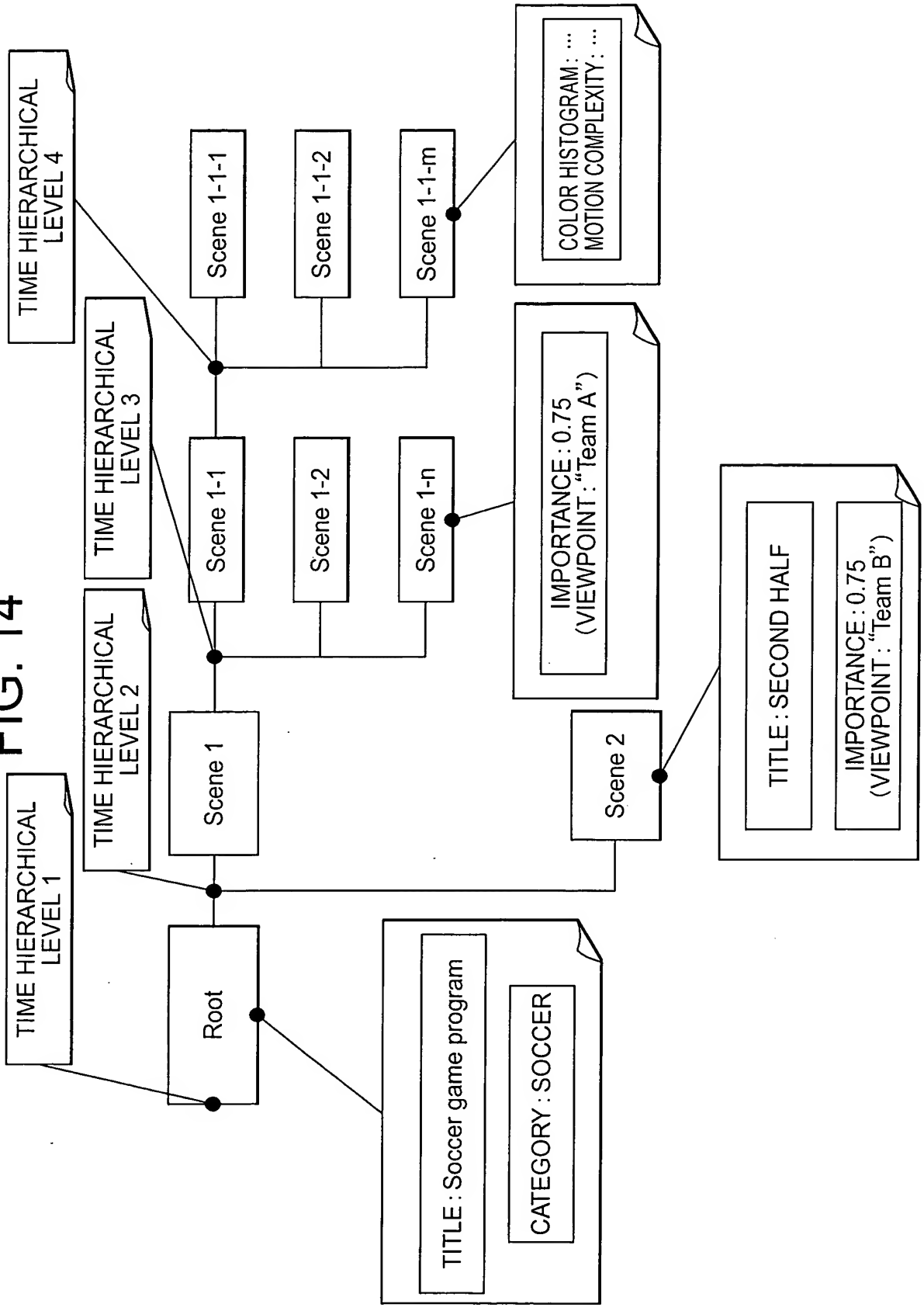
TIME HIERARCHICAL LEVEL 1
TIME HIERARCHICAL LEVEL 2
TIME HIERARCHICAL LEVEL 3
TIME HIERARCHICAL LEVEL 4
Root
Scene 1
Scene 2
Scene 1-1
Scene 1-2
Scene 1-n
Scene 1-1-1
Scene 1-1-2
Scene 1-1-m
TITLE : Soccer game program
CATEGORY : SOCCER
IMPORTANCE : 0.75
(VIEWPOINT : "Team A")
COLOR HISTOGRAM : ...
MOTION COMPLEXITY : ...
TITLE : SECOND HALF
IMPORTANCE : 0.75
(VIEWPOINT : "Team B")

FIG. 15

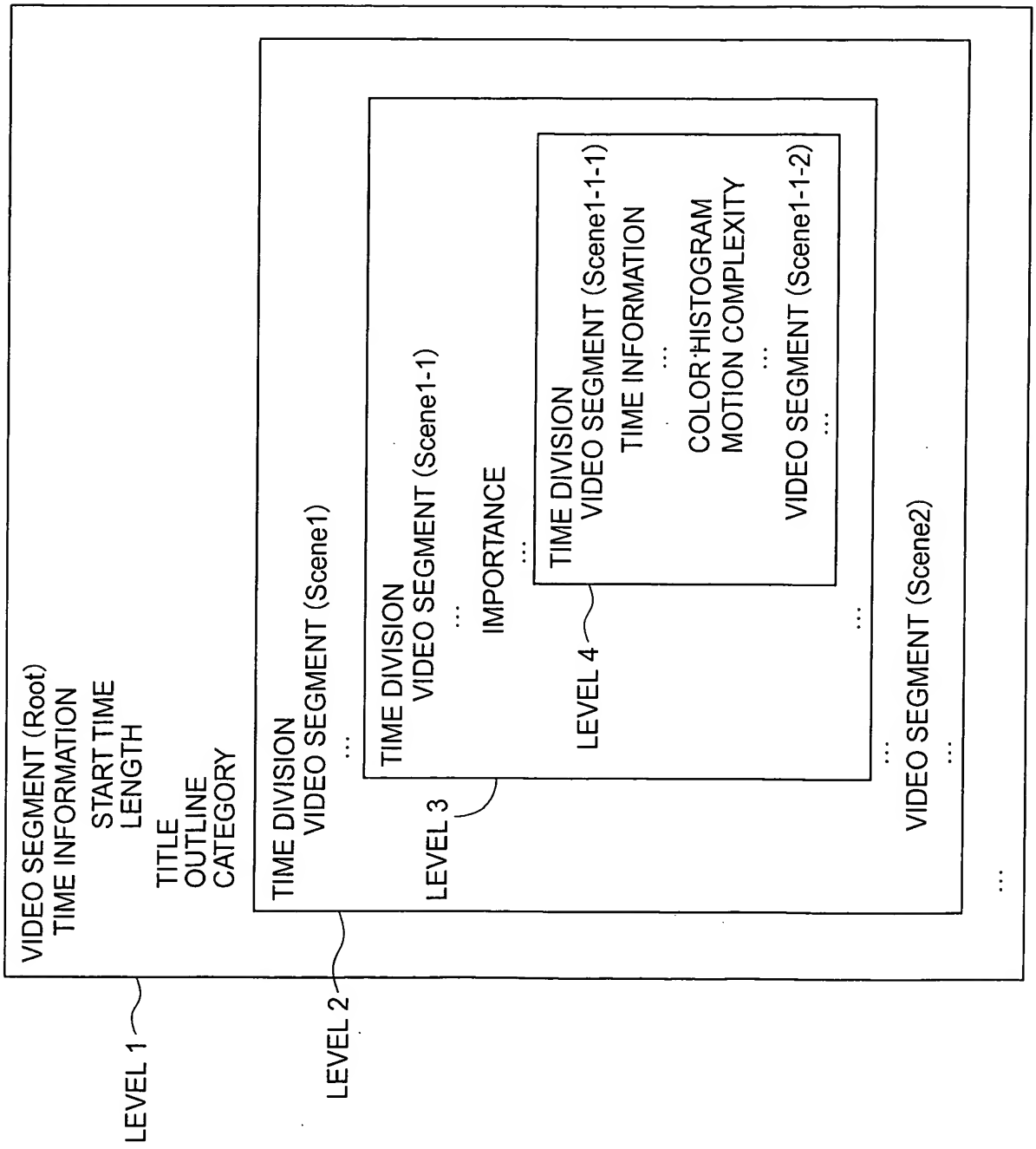
LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4
VIDEO SEGMENT (Root)
TIME INFORMATION
START TIME
LENGTH
TITLE
OUTLINE
CATEGORY
TIME DIVISION
VIDEO SEGMENT (Scene1)
TIME DIVISION
VIDEO SEGMENT (Scene1-1)
IMPORTANCE
TIME DIVISION
VIDEO SEGMENT (Scene1-1-1)
TIME INFORMATION
COLOR HISTOGRAM
MOTION COMPLEXITY
VIDEO SEGMENT (Scene1-1-2)
VIDEO SEGMENT (Scene2)

FIG. 16

METADATA OPTIMIZATION HINT INFORMATION

METADATA FILE INFORMATION:
- METADATA FILE LOCATION
- METADATA FILE SIZE
- METADATA FILE FORMAT
- SYNTAX FILE INFORMATION
- NUMBER OF APPEARING ELEMENTS

METADATA CONSTRUCTION ELEMENT INFORMATION: ···(1)
- NAME OF DESCRIPTOR
- APPEARING FREQUENCY IN METADATA
- COMPLETENESS OF DESCRIPTION
- HIERARCHICAL PROPERTY (TIME/SPACE) (MAXIMUM VALUE OF DEPTH)
- APPEARING POSITION
- CONTENTS OF DESCRIPTOR (TYPE, RANGE OF ASSUMABLE VALUES)

※DESCRIPTION BELOW (1) IS REPEATED FOR EACH PIECE OF METADATA CONSTRUCTION ELEMENT INFORMATION

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METADATA OPTIMIZATION HINT INFORMATION
METADATA FILE INFORMATION :
METADATA FILE LOCATION : http//xxx.xxx.xx.xx/xxx/xxxx
METADATA FILE SIZE : 120KB
METADATA FILE FORMAT : XML
SYNTAX FILE INFORMATION : urn:mpeg:mpeg7:schema:2001 Mpeg7-2001.xsd
NUMBER OF APPEARING ELEMENTS : 150
METADATA CONSTRUCTION ELEMENT INFORMATION :
NAME OF DESCRIPTOR : VIDEO SEGMENT
APPEARING FREQUENCY IN METADATA : 30
COMPLETENESS OF DESCRIPTION : No
TIME HIERARCHICAL PROPERTY(MAXIMUM VALUE OF DEPTH) : 4
SPACE HIERARCHICAL PROPERTY(MAXIMUM VALUE OF DEPTH) : 1
METADATA CONSTRUCTION ELEMENT :
NAME OF DESCRIPTOR : TITLE
APPEARING FREQUENCY IN METADATA : 3
APPEARING POSITION (ID LIST) : "Root", "Scene1", "Scene2"
CONTENTS OF DESCRIPTOR :
DATA TYPE : CHARACTER STRING DATA LIST
VALUE : "SOCCER GAME PROGRAM",
"FIRST HALF", "SECOND HALF"
METADATA CONSTRUCTION ELEMENT INFORMATION :
NAME OF DESCRIPTOR : IMPORTANCE
APPEARING FREQUENCY IN METADATA : 20
COMPLETENESS OF DESCRIPTION : No
APPEARING POSITION (TIME HIERARCHICAL LEVEL) : 3
CONTENTS OF DESCRIPTOR :
DATA TYPE : FLOATING-POINT DATA LIST
VALUE : 0.0,0.25,0.5,0.75,1.0

FIG. 17

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FIG. 18

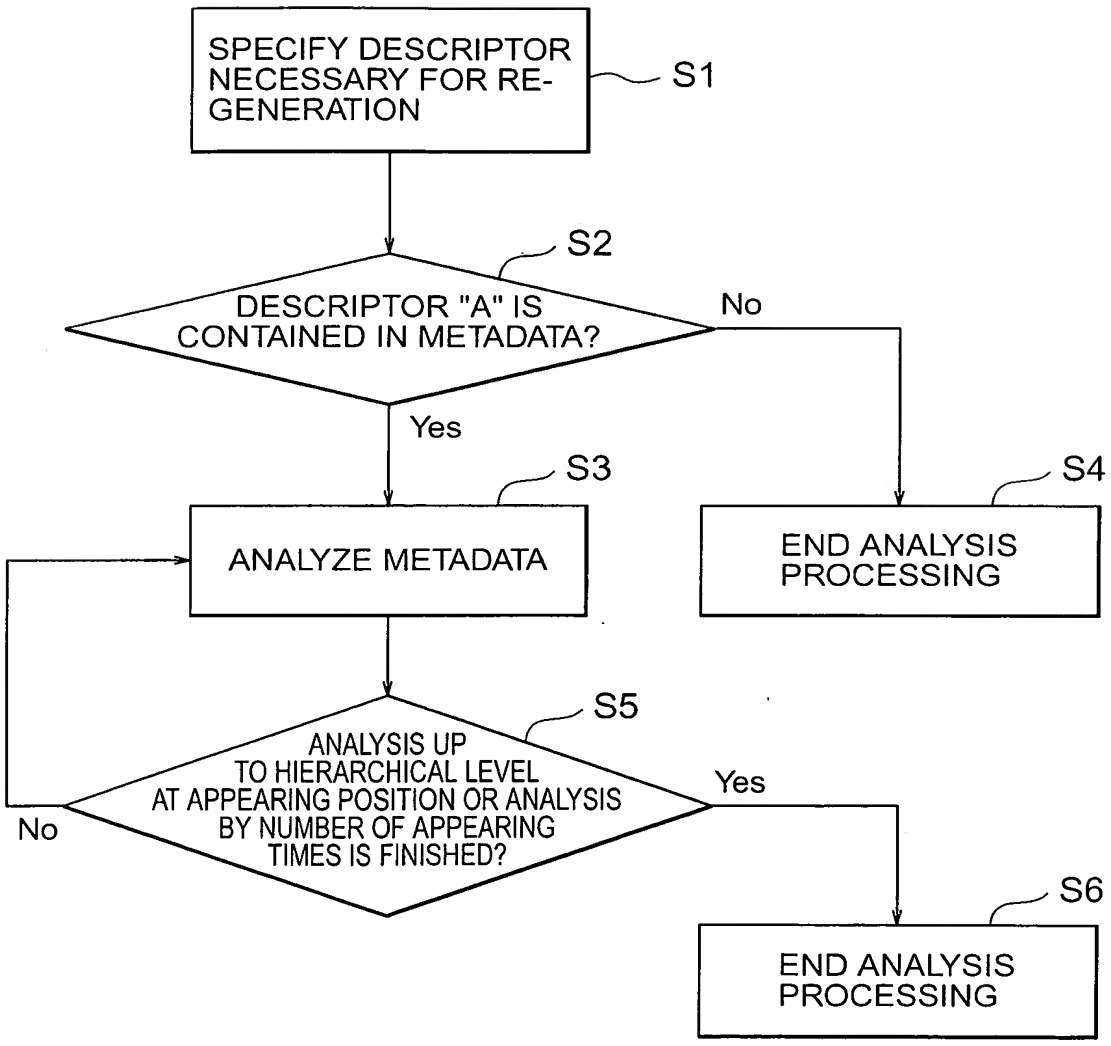

SPECIFY DESCRIPTOR NECESSARY FOR RE-GENERATION
S1
S2
DESCRIPTOR "A" IS CONTAINED IN METADATA?
No
Yes
S3
ANALYZE METADATA
S4
END ANALYSIS PROCESSING
S5
ANALYSIS UP TO HIERARCHICAL LEVEL AT APPEARING POSITION OR ANALYSIS BY NUMBER OF APPEARING TIMES IS FINISHED?
Yes
No
S6
END ANALYSIS PROCESSING

FIG. 19

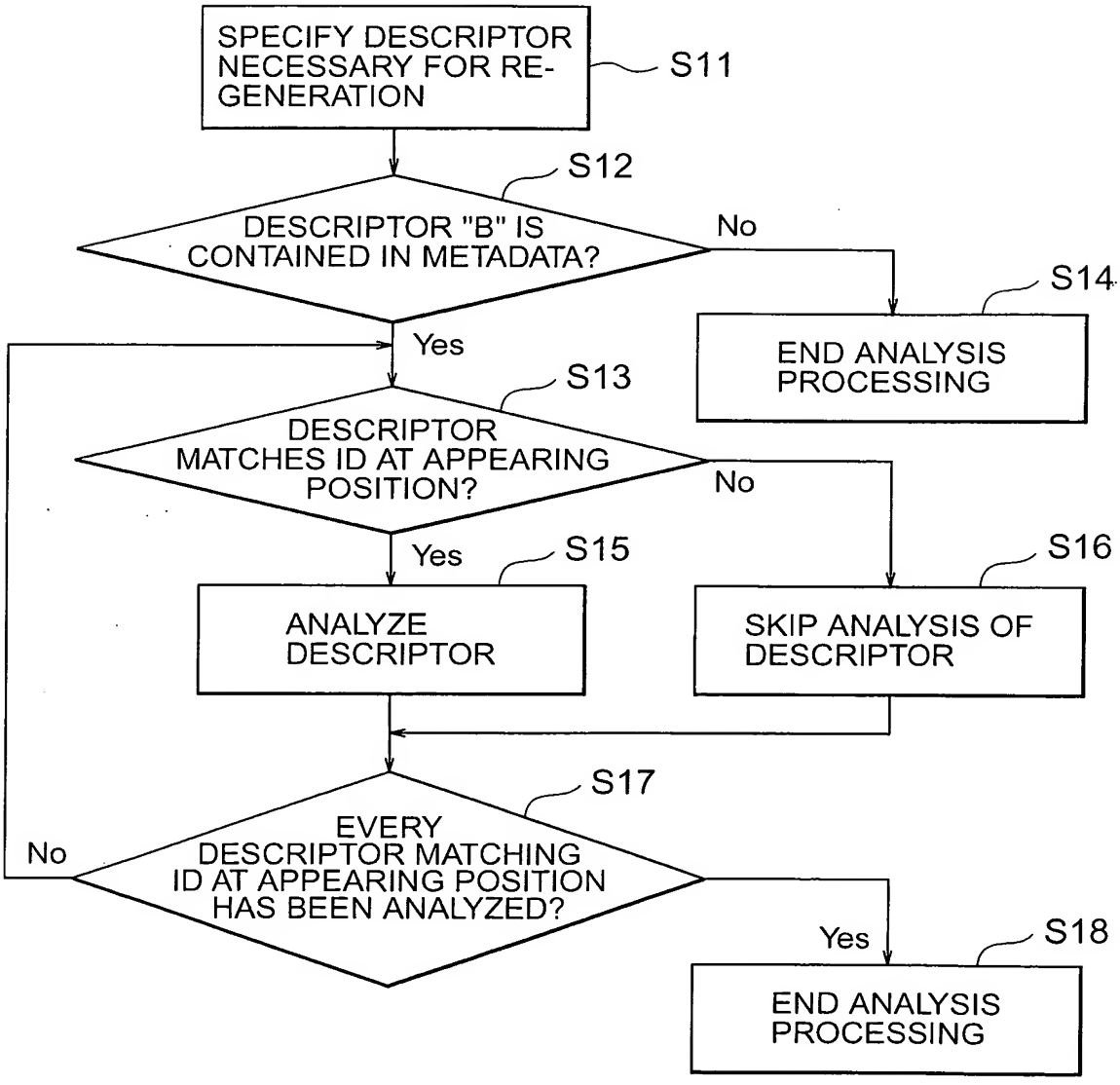

SPECIFY DESCRIPTOR NECESSARY FOR RE-GENERATION
S11
S12
DESCRIPTOR "B" IS CONTAINED IN METADATA?
No
S14
END ANALYSIS PROCESSING
Yes
S13
DESCRIPTOR MATCHES ID AT APPEARING POSITION?
No
Yes
S15
ANALYZE DESCRIPTOR
S16
SKIP ANALYSIS OF DESCRIPTOR
S17
No
EVERY DESCRIPTOR MATCHING ID AT APPEARING POSITION HAS BEEN ANALYZED?
Yes
S18
END ANALYSIS PROCESSING

FIG. 20

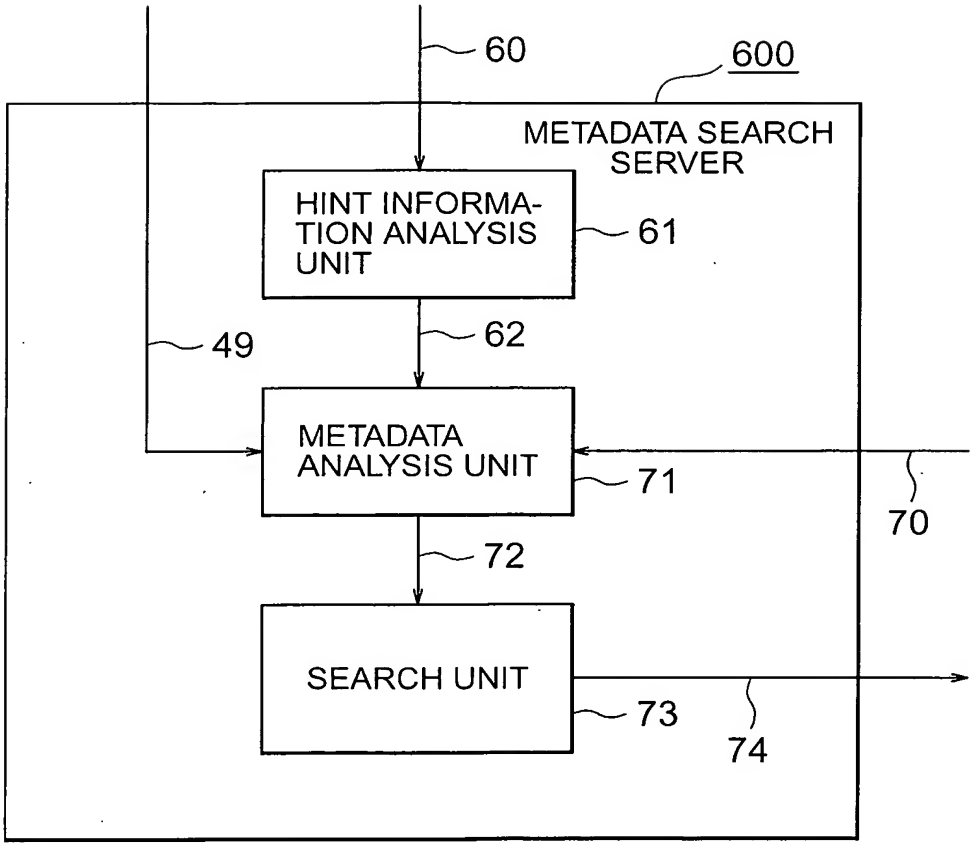

60
600
METADATA SEARCH SERVER
HINT INFORMATION ANALYSIS UNIT
61
49
62
METADATA ANALYSIS UNIT
71
70
72
SEARCH UNIT
73
74

FIG. 21

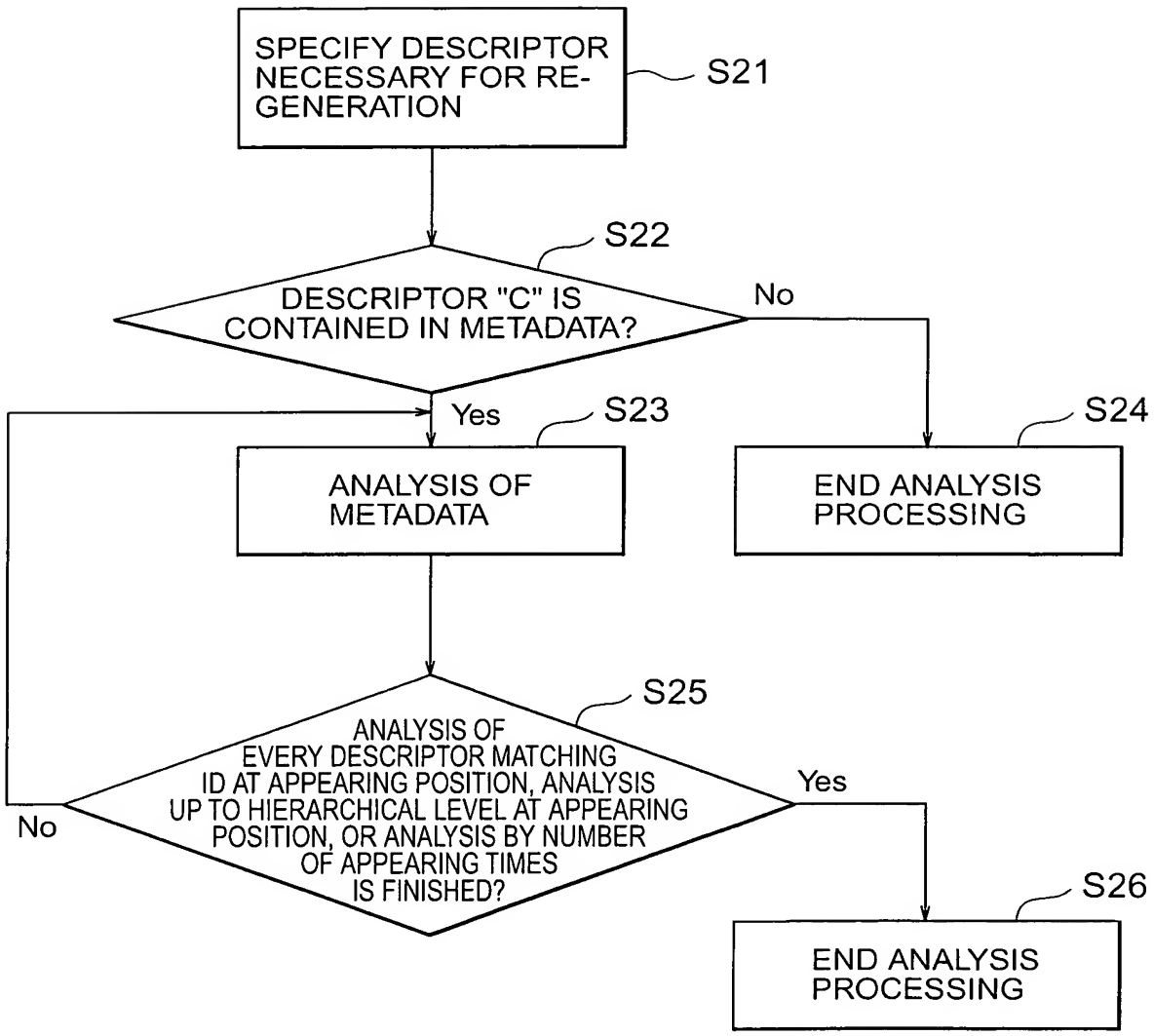

SPECIFY DESCRIPTOR NECESSARY FOR RE-GENERATION
S21
S22
DESCRIPTOR "C" IS CONTAINED IN METADATA?
No
Yes
S23
S24
ANALYSIS OF METADATA
END ANALYSIS PROCESSING
S25
ANALYSIS OF EVERY DESCRIPTOR MATCHING ID AT APPEARING POSITION, ANALYSIS UP TO HIERARCHICAL LEVEL AT APPEARING POSITION, OR ANALYSIS BY NUMBER OF APPEARING TIMES IS FINISHED?
Yes
No
S26
END ANALYSIS PROCESSING

FIG. 22

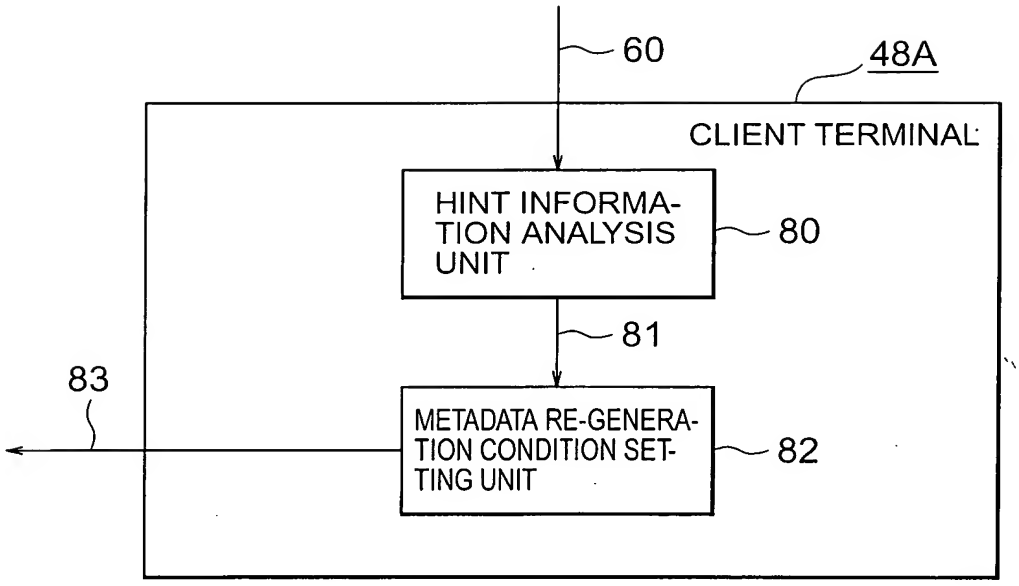
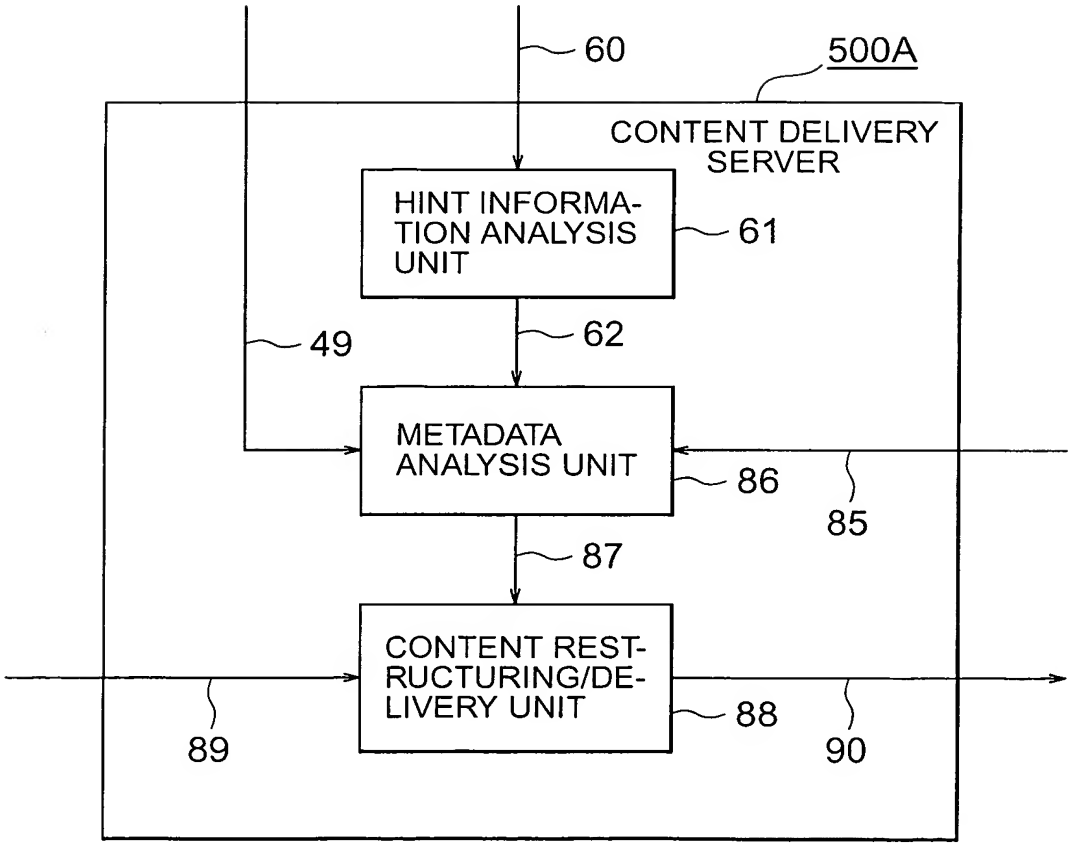

60
48A
CLIENT TERMINAL
HINT INFORMATION ANALYSIS UNIT
80
81
83
METADATA RE-GENERATION CONDITION SETTING UNIT
82

FIG. 23


60
500A
CONTENT DELIVERY SERVER
HINT INFORMATION ANALYSIS UNIT
61
62
49
METADATA ANALYSIS UNIT
86
85
87
CONTENT RESTRUCTURING/DELIVERY UNIT
88
89
90